

*REMARKS/ARGUMENTS**The Pending Claims*

Claims 17-22, 25-29, and 38-50 currently are pending and subject to examination.

Amendments to the Claims

The claims have been amended to point out more particularly and claim more distinctly the invention. In particular, claim 17 has been amended to recite a method of immunizing an animal, which method comprises administering an isolated nucleic acid encoding an infectious attenuated Kunjin virus to an animal, thereby eliciting a protective immune response to a West Nile Virus in the animal. In view of the amendments to claim 17, claims 23 and 24 have been cancelled, and the dependency of claim 25 has been changed accordingly. Claims 19, 20, and 25 also have been amended to correct formal matters regarding the claim language.

New claims 38-50 have been added. New claim 38 is supported by the specification as originally filed at, for example, page 2, lines 6-11, and page 4, line 29, through page 5, line 2. New claims 39-50 depend from claim 38 and substantially correspond to original claims 18-29.

In addition, withdrawn claims 1-16 and 30-37 have been cancelled in view of the earlier restriction requirement. Applicants reserve the right to pursue the same or similar subject matter in a continuation or divisional application.

No new matter has been added by way of these amendments.

The Office Action

Claims 17-23 and 26-29 have been rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the enablement requirement. Claims 17-23, 26, and 28 have been rejected under 35 U.S.C. § 102(e) as allegedly anticipated by U.S. Patent 6,893,866 (Westaway et al.). Claims 17-29 have been provisionally rejected for obviousness-type double patenting as allegedly unpatentable over claims 29-31 of copending U.S. Patent Application No. 10/559,146.

Reconsideration of these rejections is respectfully requested in view of the claim amendments and remarks herein.

Discussion of Rejection Under 35 U.S.C. § 112, First Paragraph

Claims 17-23 and 26-29 have been rejected as allegedly failing to comply with the enablement requirement.

The Office acknowledges that Applicants have demonstrated that immunization with infectious attenuated Kunjin virus induces protection against West Nile virus. However, the Office contends that undue experimentation would be required in order to determine whether immunization with infectious attenuated Kunjin virus would induce protection against other viruses encompassed by the genus of flaviviruses.

Applicants respectfully submit that one of ordinary skill in the art would readily be able to practice the invention as previously defined and determine whether immunization with infectious attenuated Kunjin virus induces protection against other viruses encompassed by the genus of flaviviruses without undue experimentation. However, solely in an effort to advance prosecution, and not in acquiescence of the rejection, the claims have been amended to recite (1) a method of immunizing an animal, which method comprises administering an isolated nucleic acid encoding an infectious attenuated Kunjin virus to an animal, thereby eliciting a protective immune response to a West Nile Virus in the animal (claim 17) and (2) a method of inducing an immune response in an animal, which method comprises administering an isolated nucleic acid encoding an infectious attenuated Kunjin virus to an animal, thereby eliciting an immune response to at least another flavivirus in the animal (claim 38). The Office has acknowledged that the specification is enabled for each of the methods recited in the pending claims (see Office Action dated December 23, 2008, at pages 2-3).

In view of the foregoing, the pending claims are fully enabled by the specification as originally filed, and the rejection under Section 112 should be withdrawn.

Discussion of Rejection Under 35 U.S.C. § 102(e)

Claims 17-23, 26, and 28 have been rejected as allegedly anticipated by the '866 patent. The Office contends that part (b) of claim 1 of the '866 patent discloses an embodiment in which the Kunjin virus expresses its own proteins that are sufficient for packaging and replication of infectious Kunjin virus-like particles. The Office also contends that the Kunjin virus-like particles disclosed in the '866 patent are "attenuated" because they are "pseudo" infectious. Therefore, the Office alleges that the '866 patent discloses a method of administering infectious attenuated Kunjin virus-like particles.

However, the '866 patent does not disclose the administration of "an isolated nucleic acid encoding an infectious attenuated Kunjin virus," as recited in the pending claims.

Rather, the '866 patent is directed to a gene expression and delivery system which includes, as essential features, a first vector and a second vector. Neither of these two vectors is "an isolated nucleic acid encoding an infectious attenuated Kunjin virus," as recited in the pending claims. Indeed, these two vectors are not independent entities which function without the other, but rather are interdependent isolated nucleic acid constructs that collectively act to, *inter alia*, generate virus-like particles (VLPs). Consistent with the specification of the '866 patent, claim 1 is directed to a gene expression and delivery system comprising (a) a replicon of Kunjin virus origin as a first vector, which is capable of receiving at least one nucleotide sequence without disrupting its replication capabilities and which is unable to express at least part or all of one or more structural proteins and/or a protein(s) or part thereof required for packaging of a Kunjin virus genome into a virus-like particle, and (b) at least a second vector that is capable of expressing Kunjin virus structural protein(s) for packaging of the replicon into a infectious Kunjin virus-like particle.

Accordingly, the purpose of the second vector recited in part (b) of claim 1 is to express Kunjin virus structural proteins exclusively and solely to package the replicon of Kunjin virus origin recited in part (a). In other words, the purpose of the second vector is to provide structural proteins for packaging of a separate isolated nucleic acid, namely the replicon of Kunjin virus origin. Claim 1 does not contemplate an embodiment where the second vector includes all of the genetic information required for viral replication in addition to being able to produce proteins for packaging of the second vector into VLPs, infectious or

otherwise. If this were the situation, part (b) of claim 1 would be drafted so as not to be restricted to packaging the replicon of part (a), and thereby not have antecedent basis to part (a).

Therefore, contrary to the assertions of the Office, neither of the constructs recited in claim 1 can produce a pseudoinfectious VLP without the presence of the other construct. As such,, neither of the constructs is an isolated nucleic acid that encodes an infectious attenuated Kunjin virus, as recited in the pending claims.

Moreover, it is abundantly clear from the disclosure of the '866 patent that the second vector recited in claim 1 is not of Kunjin virus origin if the replicon of part (a) is a Kunjin virus replicon. For example, the specification of the '866 patent discloses that the second vector is engineered to prevent recombination with the replicon and, more particularly, is heterologous in origin to the replicon (see, e.g., column 2, lines 36-37, and column 4, lines 62-65). The specification of the '866 patent explicitly states that "any non-flavivirus vector that is engineered to prevent recombination with the replicon may be employed in the expression system to deliver the flavivirus structural protein that is deactivated in the replicon" (see column 4, line 65, to column 5, line 2).

Furthermore if a KUN replicon is used as the self-replicating expression vector, then the second vector desirably is derived from a virus other than a flavivirus in order to ensure that recombination between a KUN replicon and the second vector will not occur. Therefore, the second vector recited in part (b) of claim 1 is designed to be incapable of producing an infectious Kunjin virus particle under any circumstance, and particularly if the replicon is of Kunjin virus origin. In fact, the gene expression and delivery system disclosed in the '866 patent was specifically designed to avoid production of true infectious VLPs, and particularly Kunjin VLPs. In particular, the '866 patent discloses:

In use, the replicon is introduced into a host cell where gene expression and hence protein production take place. Because the vector is capable of self-replication, multiple copies of the replicon will also be generated. ...

Upon introduction of the second vector, containing the structural genes necessary to produce virus particles, structural proteins are produced. These proteins encapsulate the replicon therein forming a “pseudo” recombinant virus that is only capable of producing heterologous protein inside another cell. *The pseudo-virus can not however replicate to produce new viral particles because the genes necessary for the production of the structural proteins are not provided in the replicon.* Pseudo-virus stock will only be produced when co-transfection of the replicon and the vector bearing the structural genes occurs.

‘866 patent, column 6, lines 50-67 (emphasis added).

Moreover, the ‘866 patent states at column 2, lines 6-11, that the invention described therein addresses a major disadvantage of prior art systems of possible contamination with infectious particles containing packaged full-length genomic RNA (in other words, infectious virus) due to the high probability of recombination between replicon and helper RNAs. Therefore, an express and specific intent of the gene expression and delivery system disclosed in the ‘866 patent is to avoid the production of an infectious Kunjin VLP.

In view of the foregoing, Applicants respectfully submit that the ‘866 patent does not disclose or suggest an isolated nucleic acid encoding an infectious attenuated Kunjin virus, much less a method comprising administering the same, as recited in the pending claims. Furthermore, Applicants submit that any interpretation of the ‘866 patent as disclosing an infectious Kunjin virus would be directly incongruous with the ethos and intent of the invention disclosed in the ‘866 patent. Accordingly, the ‘866 patent does not anticipate the invention recited in the pending claims, and the rejection under Section 102(e) should be withdrawn.

Obviousness-Type Double Patenting Rejection

Claims 17-29 have been provisionally rejected on the ground of nonstatutory obviousness-type double patenting as allegedly unpatentable over claims 29-31 of copending U.S. Patent Application No. 10/559,146 (“the ‘146 application”). In particular, the Office

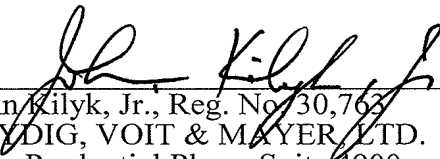
contends that claims 17-29 of the present application are not patentably distinct from claims 29-31 of the '146 application because the present claims and the claims of the '146 application are drawn to methods of immunizing an animal comprising administering an isolated nucleic acid capable of producing Kunjin virus.

Contrary to the assertions of the Office, pending claims 29-31 of the '146 application are not directed to a method comprising administering an isolated nucleic acid encoding an infectious attenuated Kunjin virus. In particular, pending claims 29-31 of the '146 application are directed to a method including the step of administering *an immunotherapeutic composition comprising flavivirus virus-like particles (VLPs)*, as opposed to any nucleic acid, let alone an isolated nucleic acid encoding an infectious attenuated Kunjin virus. Since claims 29-31 of the '146 application do not disclose or suggest the administration of an isolated nucleic acid encoding an infectious attenuated Kunjin virus, as recited in the pending claims of the present application, Applicants respectfully submit that claims 29-31 of the '146 application do not render obvious the subject matter defined by the pending claims of the present application and that the obviousness-type double patenting rejection should be withdrawn.

Conclusion

Applicants respectfully submit that the patent application is in condition for allowance. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,



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